

STATEMENT OF BASIS (AI No. 40130)

for draft Louisiana Pollutant Discharge Elimination System permit No. LA0122114 to discharge to waters of the State of Louisiana.

THE APPLICANT IS: INO Therapeutics, INC
1060 Allendale Drive
Port Allen, LA 70767

ISSUING OFFICE: Louisiana Department of Environmental Quality (LDEQ)
Office of Environmental Services
Post Office Box 4313
Baton Rouge, Louisiana 70821-4313

PREPARED BY: Yvonne Baker

DATE PREPARED: March 6, 2006

1. PERMIT STATUS

A. Reason For Permit Action:

Issuance of a Louisiana Pollutant Discharge Elimination System (LPDES) permit for a 5-year term.

B. NPDES permit - NPDES permit effective date: N/A
NPDES permit expiration date: N/A
EPA has not retained enforcement authority.

C. LPDES permits - LAR05N711
LPDES permit effective date: November 30, 2005
LPDES permit expiration date: April 30, 2006

D. Date Application Received: January 23, 2006

2. FACILITY INFORMATION

A. FACILITY TYPE/ACTIVITY - nitric oxide manufacturing facility

INO Therapeutics, INC manufactures Nitric Oxide (NO) by reacting sulfur dioxide (SO₂) and nitric acid (HNO₃). The NO is compressed to 600 psig, condensed, cooled, and packaged in cylinders for ultimate consumer use. Returned cylinders are evacuated of any residual NO, then scrubbed to oxidize the residual NO to nitrogen dioxide (NO₂). The NO₂ is then reduced to N₂ and nitrogen salts. Dinitrogen pentaoxide (N₂O₅) is yielded after being injected with a solution of sodium hydroxide (NaOH), sodium hydrogen sulfite (NaHS₂O₄), and sodium thiosulfate (NaS₂O₃). The resulting waste stream's pH is maintained between 6-9 su with the addition of NaOH.

B. FEE RATE

1. Fee Rating Facility Type: minor
2. Complexity Type: VI (BPJ from 50 points to 20 points due to minimal flow)
3. Wastewater Type: II
4. SIC code: 2834

C. LOCATION - 1060 Allendale Drive in Port Allen, West Baton Rouge Parish
Latitude 30° 26' 38", Longitude 91° 13' 13"

3. OUTFALL INFORMATION

Outfall 002

Discharge Type: Nitric Oxide cylinder washwater

Treatment: elementary neutralization

Location: at the point of discharge from the northwest perimeter ditch prior to mixing with waters of the state

Flow: 1000 GPD (batch discharge)

Discharge Route: via pipe to local drainage to the Intracoastal Waterway

4. RECEIVING WATERS

STREAM - via local drainage to the Intracoastal Waterway

BASIN AND SEGMENT - Terrebonne Basin, Segment 120109

DESIGNATED USES - a. primary contact recreation
b. secondary contact recreation
c. propagation of fish and wildlife

5. TMDL STATUS

Subsegment 120109, Intracoastal Waterway - Morgan City to Port Allen Rouge - Port Allen Locks to Bayou Sorrel Locks, is listed on LDEQ's Final 2004 303(d) List as impaired for nutrients (EPA - Category 5), organic enrichment/low DO (EPA - Category 5), pathogen indicators, and sulfates. To date no TMDLs have been completed for this waterbody. A reopener clause will be established in the permit to allow for the requirement of more stringent effluent limitations and requirements as imposed by a TMDL. Until completion of TMDLs for the Terrebonne Basin, those suspected causes for impairment which are not directly attributed to the pharmaceutical manufacturing point source category have been eliminated in the formulation of effluent limitations and other requirements of this permit. Additionally, suspected causes of impairment which could be attributed to pollutants which were not determined to be discharged at a level which would cause, have the reasonable potential to cause or contribute to an excursion above any present state water quality standard were also eliminated.

Based on the evaluation of the effluent discharges, it was determined that the facility does not have the potential to discharge pollutants which may contribute to the nutrients, pathogen indicators, and sulfates impairments of the receiving waterbody. However, it was determined that the facility does have the potential to discharge pollutants which may contribute to the organic enrichment/low DO impairment. Therefore, for the purpose of this permit, COD and BOD₅ limits were placed on Outfall 002.

6. PROPOSED EFFLUENT LIMITS

BASIS - See Rationale below.

7. COMPLIANCE HISTORY/COMMENTS

1. WQMD - There is no enforcement history on file as of March 6, 2006.
2. DMR Review/Excursions - No analytical sampling and analysis is required by the Multi-Sector General Permit

8. EXISTING EFFLUENT LIMITS

Parameter	Limitation
TOC	50 mg/L
Oil and Grease	15 mg/L

No analytical sampling and analysis is required, however the facility must insure the pollution prevention plan will assure compliance with these effluent limitations and must conduct monitoring of each outfall subject to Sector C in accordance with Part 5 of the MSGP.

9. ENDANGERED SPECIES

The receiving waterbody, Subsegment 120109 of the Terrebonne Basin is not listed in Section II.2 of the Implementation Strategy as requiring consultation with the U.S. Fish and Wildlife Service (FWS). This strategy was submitted with a letter dated October 21, 2005 from Watson (FWS) to Gautreaux (LDEQ).

Therefore, in accordance with the Memorandum of Understanding between the LDEQ and the FWS, no further informal (Section 7, Endangered Species Act) consultation is required. It was determined that the issuance of the LPDES permit is not likely to have an adverse effect on any endangered or candidate species or the critical habitat. The effluent limitations established in the permit ensure protection of aquatic life and maintenance of the receiving water as aquatic habitat.

10. HISTORIC SITES

The discharge is from an existing facility location, which does not include an expansion on undisturbed soils. Therefore, there should be no potential effect to sites or properties on or eligible for listing on the National Register of Historic Places, and in accordance with the "Memorandum of Understanding for the Protection of Historic Properties in Louisiana Regarding LPDES Permits" no consultation with the Louisiana State Historic Preservation Officer is required.

11. TENTATIVE DETERMINATION

On the basis of preliminary staff review, the Department of Environmental Quality has made a tentative determination to issue a permit for the discharge described in the application.

12. PUBLIC NOTICES

Upon publication of the public notice, a public comment period shall begin on the date of publication and last for at least 30 days thereafter. During this period, any interested persons may submit written comments on the draft permit and may request a public hearing to clarify issues involved in the permit decision at this Office's address on the first page of the statement of basis. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing.

Public notice published in:

Local newspaper of general circulation

Office of Environmental Services Public Notice Mailing List

Rationale for INO Therapeutics, INC

1. Outfall 002 - Nitric Oxide cylinder washwater (estimated flow is 1000 GPD)

<u>Pollutant</u>	<u>Limitation</u> Mo. Avg:Daily Max (mg/L/day)	<u>Reference</u>
Flow (GPD)	Report:Report	LAC 33:IX.2361.1.1.B
BOD5	111:267	40 CFR 439.35
TSS	166:472	40 CFR 439.35
COD	856:1675	40 CFR 439.35
1,2-dichlorobenzene (o-dichlorobenzene)	0.06:0.15	40 CFR 439.35
1,2-dichloroethane	0.1:0.4	40 CFR 439.35
2- methoxy ethanol (Methyl Cellosolve)	40.6:100.0	40 CFR 439.35
Acetone	0.2:0.5	40 CFR 439.35
Acetonitrile	10.2:25.0	40 CFR 439.35
Ammonia (as N)	29.4:84.1	40 CFR 439.35
Amyl alcohol	4.1:10.0	40 CFR 439.35
Benzene	0.02:0.05	40 CFR 439.35
Chlorobenzene	0.06:0.15	40 CFR 439.35
Chloroform	0.02:0.13	40 CFR 439.35
Cyanide (T)	0.14:0.34	Water Quality Based Limitations
Diethyl amine	102.0:250.0	40 CFR 439.35
Dimethyl sulfoxide	37.5:91.5	40 CFR 439.35
Ethanol	4.1:10.0	40 CFR 439.35
Ethyl acetate	0.5:1.3	40 CFR 439.35
Isobutyraldehyde	0.5:1.2	40 CFR 439.35
Isopropanol	1.6:3.9	40 CFR 439.35
Isopropyl acetate	0.5:1.3	40 CFR 439.35
Isopropyl ether	2.6:8.4	40 CFR 439.35
Methanol	4.1:10.0	40 CFR 439.35
Methyl formate	0.5:1.3	40 CFR 439.35
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	0.2:0.5	40 CFR 439.35
Methylene chloride	0.3:0.9	40 CFR 439.35
n-Amyl acetate	0.5:1.3	40 CFR 439.35
n-Butyl acetate	0.5:1.3	40 CFR 439.35
n-Heptane	0.02:0.05	40 CFR 439.35
n-Hexane	0.02:0.03	40 CFR 439.35
Phenol	0.02:0.05	40 CFR 439.35
Tetrahydrofuran	2.6:8.4	40 CFR 439.35
Toluene	0.02:0.06	40 CFR 439.35
Triethyl amine	102.0:250.0	40 CFR 439.35
Xylenes	0.01:0.03	40 CFR 439.35

Treatment: elementary neutralization

Monitoring Frequency: Once per discharge for all parameters at the point of discharge from the northwest perimeter ditch prior to mixing with waters of the state.

Limits Justification: All the limitations, except Cyanide are based on the Pharmaceutical Manufacturing Point Source Category Effluent Limitation Guidelines (ELG), Subpart C – Chemical Synthesis Products Subcategory 40 CFR 439.35. Water quality based limitations were used for Cyanide because they were more stringent than the technology limitations.

BPJ Best Professional Judgement
NSPS New Source Performance Standards
su Standard Units

NOTE

For outfalls containing concentration limits, the usage of concentration limits is based on BPJ for similar outfalls since the flow is variable and estimated.

STORM WATER POLLUTION PREVENTION PLAN (SWP3) REQUIREMENT

As per LAC33:IX.2511.B.14.k, stormwater discharges from facilities classified as SIC Code 2834 is considered to be associated with industrial activities. Therefore, an SWP3 is included in the permit.

The SWP3 shall be prepared, implemented, and maintained within six (6) months of the effective date of the final permit. The plan should identify potential sources of storm water pollution and ensure the implementation of practices to prevent and reduce pollutants in storm water discharges associated with industrial activity at the facility (see narrative requirements for the AI).

APPENDIX A-1 LA0122114, AI No. 40130

Documentation and Explanation of Water Quality Screen
and Associated Lotus Spreadsheet

Each reference column is marked by a set of parentheses enclosing a number and asterisk, for example (*1) or (*19). These columns represent inputs, existing data sets, calculation points, and results for determining Water Quality Based Limits for an effluent of concern. The following represents a summary of information used in calculating the water quality screen:

Receiving Water Characteristics:

Receiving Water: Intracoastal Waterway via local drainage

Critical Flow, Qrc (cfs): 0

Harmonic Mean Flow, Qrh (cfs): 1

Segment No.: 120109

Receiving Stream Hardness (mg/L): 174 mg/l

Receiving Stream TSS (mg/L): 41 mg/l

MZ Stream Factor, Fs: N/A

Plume distance, Pf: N/A

Effluent Characteristics:

Company: INO Therapeutics, INC.

Facility flow, Qe (MGD): 0.001

Effluent Hardness: N/A

Effluent TSS: N/A

Pipe/canal width, Pw: N/A

Permit Number: LA0122114

Variable Definition:

Qrc, critical flow of receiving stream, cfs

Qrh, harmonic mean flow of the receiving stream, cfs

Pf = Allowable plume distance in feet, specified in LAC 33.IX.1115.D

Pw = Pipe width or canal width in feet

Qe, total facility flow, MGD

Fs, stream factor from LAC.IX.33.11 (1 for harmonic mean flow)

Cu, ambient concentration, ug/L

Cr, numerical criteria from LAC.IX.1113, Table 1

WLA, wasteload allocation

LTA, long term average calculations

WQBL, effluent water quality based limit

ZID, Zone of Initial Dilution in % effluent

MZ, Mixing Zone in % effluent

Formulas used in aquatic life water quality screen (dilution type WLA):

Streams:

$$\text{Dilution Factor} = \frac{Q_e}{(Q_{rc} \times 0.6463 \times F_s + Q_e)}$$

$$\text{WLA a,c,h} = \frac{Cr}{- (F_s \times Q_{rc} \times 0.6463 \times C_u)}$$

Dilution Factor

Qe

Static water bodies (in the absence of a site specific dilution):

Discharge from a pipe:

Discharge from a canal:

Critical

$$\text{Dilution} = \frac{(2.8) P_w \pi^{1/2}}{P_f}$$

Critical

$$\text{Dilution} = \frac{(2.38) (P_w^{1/2})}{(P_f)^{1/2}}$$

$$\text{WLA} = \frac{(Cr-Cu) P_f}{(2.8) P_w \pi^{1/2}}$$

$$\text{WLA} = \frac{(Cr-Cu) P_f^{1/2}}{2.38 P_w^{1/2}}$$

Formulas used in human health water quality screen, human health non-carcinogens (dilution type WLA):

Streams:

$$\text{Dilution Factor} = \frac{Q_e}{(Q_{rc} \times 0.6463 + Q_e)}$$

$$\text{WLA a,c,h} = \frac{Cr}{\text{Dilution Factor}} - \frac{(Q_{rc} \times 0.6463 \times Cu)}{Q_e}$$

Formulas used in human health water quality screen, human health carcinogens (dilution type WLA):

$$\text{Dilution Factor} = \frac{Q_e}{(Q_{rh} \times 0.6463 + Q_e)}$$

$$\text{WLA a,c,h} = \frac{Cr}{\text{Dilution Factor}} - \frac{(Q_{rh} \times 0.6463 \times Cu)}{Q_e}$$

Static water bodies in the absence of a site specific dilution (human health carcinogens and human health non-carcinogens):

Discharge from a pipe:

Discharge from a canal:

Critical

$$\text{Dilution} = \frac{(2.8) P_w \pi^{1/2}}{P_f}$$

Critical

$$\text{Dilution} = \frac{(2.38) (P_w^{1/2})}{(P_f)^{1/2}}$$

$$\text{WLA} = \frac{(Cr-Cu) P_f^*}{(2.8) P_w \pi^{1/2}}$$

$$\text{WLA} = \frac{(Cr-Cu) P_f^{1/2*}}{2.38 P_w^{1/2}}$$

* P_f is set equal to the mixing zone distance specified in LAC 33:IX.1115 for the static water body type, i.e., lake, estuary, Gulf of Mexico, etc.

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If a site specific dilution is used, WLA are calculated by subtracting Cu from Cr and dividing by the site specific dilution for human health and aquatic life criteria.

$$WLA = \frac{(Cr - Cu)}{\text{site specific dilution}}$$

Longterm Average Calculations:

$$LTAA = WLAa \times 0.32$$

$$LTAc = WLAc \times 0.53$$

$$LTAh = WLAh$$

WQBL Calculations:

Select most limiting LTA to calculate daily max and monthly avg WQBL

If aquatic life LTA is more limiting:

$$\text{Daily Maximum} = \text{Min}(LTAA, LTAc) \times 3.11$$

$$\text{Monthly Average} = \text{Min}(LTAc, LTAh) \times 1.31$$

If human health LTA is more limiting:

$$\text{Daily Maximum} = LTAh \times 2.38$$

$$\text{Monthly Average} = LTAh$$

Mass Balance Formulas:

$$\text{mass (lbs/day)}: (\text{ug/L}) \times 1/1000 \times (\text{flow, MGD}) \times 8.34 = \text{lbs/day}$$

$$\text{concentration(ug/L)}: \frac{\text{lbs/day}}{(\text{flow, MGD}) \times 8.34 \times 1/1000} = \text{ug/L}$$

The following is an explanation of the references in the spreadsheet.

- (*1) Parameter being screened.
- (*2) Instream concentration for the parameter being screened in ug/L. In the absence of accurate supporting data, the instream concentration is assumed to be zero (0).
- (*3) Monthly average effluent or technology value in concentration units of ug/L or mass units of lbs/day. Units determined on a case-by-case basis as appropriate to the particular situation.
- (*4) Daily maximum technology value in concentration units of ug/L or mass units of lbs/day. Units determined on a case-by-case basis as appropriate to the particular situation.
- (*5) Minimum analytical Quantification Levels (MQL's). Established in a letter dated January 27, 1994 from Wren Stenger of EPA Region 6 to Kilren Vidrine of LDEQ and from the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". The applicant must test for the parameter at a level at least as sensitive as the specified MQL. If this is not done, the MQL becomes the application value for screening purposes if the pollutant is suspected to be present

on-site and/or in the waste stream. Units are in ug/l or lbs/day depending on the units of the effluent data.

- (*6) States whether effluent data is based on 95th percentile estimation. A "1" indicates that a 95th percentile approximation is being used, a "0" indicates that no 95th percentile approximation is being used.
- (*7) 95th percentile approximation multiplier (2.13). The constant, 2.13, was established in memorandum of understanding dated October 8, 1991 from Jack Ferguson of Region 6 to Jesse Chang of LDEQ and included in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". This value is screened against effluent Water Quality Based Limits established in columns (*18) - (*21). Units are in ug/l or lbs/day depending on the units of the measured effluent data.
- (*8) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, freshwater (FW) or marine water (MW) (whichever is applicable) aquatic life protection, acute criteria. Units are specified. Some metals are hardness dependent. The hardness of the receiving stream shall generally be used, however a flow weighted hardness may be determined in site-specific situations. Dissolved metals are converted to Total metals using partition coefficients in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Similar to hardness, the TSS of the receiving stream shall generally be used, however, a flow weighted TSS may be determined in site-specific situations.

Hardness Dependent Criteria:

<u>Metal</u>	<u>Formula</u>
Cadmium	$e^{(1.1280 [\ln(\text{hardness})] - 1.6774)}$
Chromium III	$e^{(0.8190 [\ln(\text{hardness})] + 3.6880)}$
Copper	$e^{(0.9422 [\ln(\text{hardness})] - 1.3884)}$
Lead	$e^{(1.2730 [\ln(\text{hardness})] - 1.4600)}$
Nickel	$e^{(0.8460 [\ln(\text{hardness})] + 3.3612)}$
Zinc	$e^{(0.8473 [\ln(\text{hardness})] + 0.8604)}$

Dissolved to Total Metal Multipliers for Freshwater Streams (TSS dependent):

<u>Metal</u>	<u>Multiplier</u>
Arsenic	$1 + 0.48 \times \text{TSS}^{-0.73} \times \text{TSS}$
Cadmium	$1 + 4.00 \times \text{TSS}^{-1.13} \times \text{TSS}$
Chromium III	$1 + 3.36 \times \text{TSS}^{-0.93} \times \text{TSS}$
Copper	$1 + 1.04 \times \text{TSS}^{-0.74} \times \text{TSS}$
Lead	$1 + 2.80 \times \text{TSS}^{-0.80} \times \text{TSS}$
Mercury	$1 + 2.90 \times \text{TSS}^{-1.14} \times \text{TSS}$
Nickel	$1 + 0.49 \times \text{TSS}^{-0.57} \times \text{TSS}$
Zinc	$1 + 1.25 \times \text{TSS}^{-0.70} \times \text{TSS}$

Dissolved to Total Metal Multipliers for Marine Environments (TSS dependent):

<u>Metal</u>	<u>Multiplier</u>
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Copper	$1 + (10^{4.86} \times \text{TSS}^{-0.72} \times \text{TSS}) \times 10^{-6}$
Lead	$1 + (10^{6.06} \times \text{TSS}^{-0.85} \times \text{TSS}) \times 10^{-6}$
Zinc	$1 + (10^{5.36} \times \text{TSS}^{-0.52} \times \text{TSS}) \times 10^{-6}$

If a metal does not have multiplier listed above, then the dissolved to total metal multiplier shall be 1.

- (*9) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, freshwater (FW) or marine water (MW) (whichever is applicable) aquatic life protection, chronic criteria. Units are specified. Some metals are hardness dependent. The hardness of the receiving stream shall generally be used, however a flow weighted hardness may be determined in site-specific situations. Dissolved metals are converted to Total metals using partition coefficients in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Similar to hardness, the TSS of the receiving stream shall generally be used, however, a flow weighted TSS may be determined in site-specific situations.

Hardness dependent criteria:

<u>Metal</u>	<u>Formula</u>
Cadmium	$e^{(0.7852 [\ln(\text{hardness})] - 3.4900)}$
Chromium III	$e^{(0.8473 [\ln(\text{hardness})] + 0.7614)}$
Copper	$e^{(0.8545 [\ln(\text{hardness})] - 1.3860)}$
Lead	$e^{(1.2730 [\ln(\text{hardness})] - 4.7050)}$
Nickel	$e^{(0.8460 [\ln(\text{hardness})] + 1.1645)}$
Zinc	$e^{(0.8473 [\ln(\text{hardness})] + 0.7614)}$

Dissolved to total metal multiplier formulas are the same as (*8), acute numerical criteria for aquatic life protection.

- (*10) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, human health protection, drinking water supply (HHDW), non-drinking water supply criteria (HHNDW), or human health non-primary contact recreation (HHNPCR) (whichever is applicable). A DEQ and EPA approved Use Attainability Analysis is required before HHNPCR is used, e.g., Monte Sano Bayou. Units are specified.
- (*11) C if screened and carcinogenic. If a parameter is being screened and is carcinogenic a "C" will appear in this column.
- (*12) Wasteload Allocation for acute aquatic criteria (WLAA). Dilution type WLAA is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the acute aquatic numerical criteria for that parameter. Units are in ug/L. Dilution WLAA formulas for streams:

$$\text{WLAA} = (\text{Cr}/\text{Dilution Factor}) - \frac{(\text{Fs} \times \text{Qrc} \times 0.6463 \times \text{Cu})}{\text{Qe}}$$

Dilution WLAA formulas for static water bodies:

$$\text{WLAA} = (\text{Cr} - \text{Cu})/\text{Dilution Factor}$$

Cr represents aquatic acute numerical criteria from column (*8).

If Cu data is unavailable or inadequate, assume Cu=0.

If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

- (*13) Wasteload Allocation for chronic aquatic criteria (WLAc). Dilution type WLAc is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the chronic aquatic numerical criteria for that parameter. Units are in ug/L. Dilution WLAc formula:

$$WLAc = (Cr/Dilution\ Factor) - \frac{(Fs \times Qrc \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAc formulas for static water bodies:

$$WLAc = (Cr-Cu)/Dilution\ Factor)$$

Cr represents aquatic chronic numerical criteria from column (*9).

If Cu data is unavailable or inadequate, assume Cu=0.

If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

- (*14) Wasteload Allocation for human health criteria (WLAh). Dilution type WLAh is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the human health numerical criteria for that parameter. Units are in ug/L. Dilution WLAh formula:

$$WLAh = (Cr/Dilution\ Factor) - \frac{(Fs \times Qrc, Qrh \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAh formulas for static water bodies:

$$WLAh = (Cr-Cu)/Dilution\ Factor)$$

Cr represents human health numerical criteria from column (*10).

If Cu data is unavailable or inadequate, assume Cu=0.

If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

- (*15) Long Term Average for aquatic numerical criteria (LTAA). WLAa numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 0.32. WLAa X 0.32 = LTAA.

If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

- (*16) Long Term Average for chronic numerical criteria (LTAc). WLAc numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 0.53. WLAc X 0.53 = LTAc.

If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

- (*17) Long Term Average for human health numerical criteria (LTAh). WLAh numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 1. WLAc X 1 = LTAh.

If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

- (*18) Limiting Acute, Chronic or Human Health LTA's. The most limiting LTA is placed in this column. Units are consistent with the WLA calculation. If standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then the type of limit, Aquatic or Human Health (HH), is indicated.
- (*19) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of concentration, ug/L. If aquatic life criteria was the most limiting LTA then the limiting LTA is multiplied by 1.31 to determine the average WQBL ($LTA_{\text{limiting aquatic}} \times 1.31 = WQBL_{\text{monthly average}}$). If human health criteria was the most limiting criteria then $LTA_{\text{h}} = WQBL_{\text{monthly average}}$. If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then either the human health criteria or the chronic aquatic life criteria shall appear in this column depending on which is more limiting.
- (*20) End of pipe Water Quality Based Limit (WQBL) daily maximum in terms of concentration, ug/L. If aquatic life criteria was the most limiting LTA then the limiting LTA is multiplied by 3.11 to determine the daily maximum WQBL ($LTA_{\text{limiting aquatic}} \times 3.11 = WQBL_{\text{daily max}}$). If human health criteria was the most limiting criteria then LTA_{h} is multiplied by 2.38 to determine the daily maximum WQBL ($LTA_{\text{limiting aquatic}} \times 2.38 = WQBL_{\text{daily max}}$). If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then either the human health criteria or the acute aquatic life criteria shall appear in this column depending on which is more limiting.
- (*21) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of mass, lbs/day. The mass limit is determined by using the mass balance equations above. Monthly average WQBL, ug/l/1000 X facility flow, MGD X 8.34 = monthly average WQBL, lbs/day.
- (*22) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of mass, lbs/day. Mass limit is determined by using the mass balance equations above. Daily maximum WQBL, ug/l/1000 X facility flow, MGD X 8.34 = daily maximum WQBL, lbs/day.
- (*23) Indicates whether the screened effluent value(s) need water quality based limits for the parameter of concern. A "yes" indicates that a water quality based limit is needed in the permit; a "no" indicates the reverse.

Developer: Bruce Fielding

Time: 07:13 AM

Software: Lotus 4.0

LA0122114, AI40130

Revision date: 12/13/02

Water Quality Screen for INO Therapeutics, INC

Input variables:

Receiving Water Characteristics:

Dilution:

ZID Fs = 0.1

Toxicity Dilution Series:

Biomonitoring dilution: 0.1523693

Dilution Series Factor: 0.75

Receiving Water Name= Intracoastal Waterway

Critical flow (Qr) cfs= 0.1

MZ Fs = 1

Harm. mean/avg tidal cfs= 1

Critical Qr (MGD)= 0.06463

Drinking Water=1 HHNPCR=2 1

Harm. Mean (MGD)= 0.6463

Marine, 1=y, 0=n

ZID Dilution = 0.1339944

Rec. Water Hardness= 174

MZ Dilution = 0.0152369

Rec. Water TSS= 41

HHnc Dilution= 0.0152369

Fisch/Specific=1,Stream=0

HHc Dilution= 0.0015449

Diffuser Ratio=

ZID Upstream = 6.463

MZ Upstream = 64.63

MZhhnc Upstream= 64.63

Effluent Characteristics:

Permittee=

Permit Number= LA0122114, AI40130

Facility flow (Qef),MGD= 0.001

MZhhc Upstream= 646.3

ZID Hardness= ---

MZ Hardness= ---

ZID TSS= ---

MZ TSS= ---

Multipliers:

WLAA --> LTAA 0.32

WLAC --> LTAC 0.53

LTA a,c-->WQBL avg 1.31

LTA a,c-->WQBL max 3.11

LTA h --> WQBL max 2.38

WQBL-limit/report 2.13

WLA Fraction 1

WQBL Fraction 1

Conversions:

ug/L-->lbs/day Qef 8.34E-06

ug/L-->lbs/day Qeo 0

ug/L-->lbs/day Qr 0.000834

lbs/day-->ug/L Qeo 119904.08

lbs/day-->ug/L Qef 119904.08

diss-->tot 1=y0=n 1

Cu diss-->tot1=y0=n 1

cfs-->MGD 0.6463

Page Numbering/Labeling

Appendix

Appendix B-1

Page Numbers 1=y, 0=n 1

Input Page # 1=y, 0=n 1

Fischer/Site Specific inputs:

Pipe=1,Canal=2,Specific=3

Pipe width, feet

ZID plume dist., feet

MZ plume dist., feet

HHnc plume dist., feet

HHc plume dist., feet

Fischer/site specific dilutions:

F/specific ZID Dilution = ---

F/specific MZ Dilution = ---

F/specific HHnc Dilution= ---

F/specific HHc Dilution= ---

Receiving Stream:

Default Hardness= 25

Default TSS= 10

99 Crit., 1=y, 0=n 1

Partition Coefficients; Dissolved-->Total

METALS

FW

Total Arsenic 2.3082564

Total Cadmium 3.4683008

Chromium III 5.3574674

Chromium VI 1

Total Copper 3.7312229

Total Lead 6.8845709

Total Mercury 2.7242819

Total Nickel 3.419319

Total Zinc 4.8084229

Aquatic Life, Dissolved

Metal Criteria, ug/L

METALS

ACUTE CHRONIC

Arsenic 339.8 150

Cadmium 57.947172 1.5521749

Chromium III 863.72396 280.18312

Chromium VI 15.712 10.582

Copper 31.051276 19.71916

Lead 117.37814 4.5740577

Mercury 1.734 0.012

Nickel 2261.4439 251.15148

Zinc 182.98825 167.09602

Site Specific Multiplier Values:

CV = ---

N = ---

WLAA --> LTAA ---

WLAC --> LTAC ---

LTA a,c-->WQBL avg ---

LTA a,c-->WQBL max ---

LTA h --> WQBL max ---

LA0122114, AI40130

(*1)	(*2)	(*3)	(*4)	(*5)	(*6)	(*7)	(*8)	(*9)	(*10)	(*11)
Toxic	Cu Effluent		Effluent	MQL Effluent		95th %	Numerical Criteria		HH	
Parameters	Instream	/Tech	/Tech	1=No 95%	estimate	Non-Tech	Acute	Chronic	HH/DW	Carcinogen
	Conc.	(Avg)	(Max)	0=95 %			FW	FW		Indicator
	ug/L	ug/L	ug/L	ug/L		ug/L	ug/L	ug/L	ug/L	"C"
NONCONVENTIONAL										
Total Phenols (4AAP)				5			700	350	5	
3-Chlorophenol				10					0.1	
4-Chlorophenol				10			383	192	0.1	
2,3-Dichlorophenol				10					0.04	
2,5-Dichlorophenol				10					0.5	
2,6-Dichlorophenol				10					0.2	
3,4-Dichlorophenol				10					0.3	
2,4-Dichlorophenoxy-										
acetic acid (2,4-D)				---					100	
2-(2,4,5-Trichlorophen-										
oxy) propionic acid										
(2,4,5-TP, Silvex)				---					10	
METALS AND CYANIDE										
Total Arsenic			200	10	0		784.34554	346.23846	115.41282	
Total Cadmium			100	1	0		200.97822	5.3834095	34.683008	
Chromium III			200	10	0		4627.373	1501.0719	267.87337	
Chromium VI				10			15.712	10.582	50	C
Total Copper			674	10	0		115.85923	73.576581	3731.2229	
Total Lead			100	5	0		808.09815	31.490425	344.22855	
Total Mercury				0.2			4.7239047	0.0326914	5.4485637	
Total Nickel			290	40	0		7732.5981	858.76704		
Total Zinc			500	20	0		879.8849	803.46834	24042.115	
Total Cyanide		9400	33500	20	1		45.9	5.2	663.8	
DIOXIN										
2,3,7,8 TCDD; dioxin				1.0E-05					7.1E-07	C
VOLATILE COMPOUNDS										
Benzene		20	50	10	1		2249	1125	1.1	C
Bromoform			27	10	0		2930	1465	3.9	C
Bromodichloromethane				10					0.2	C
Carbon Tetrachloride				10			2730	1365	0.22	C
Chloroform		20	130	10	1		2890	1445	5.3	C
Dibromochloromethane			9.3	10	0				0.39	C
1,2-Dichloroethane		100	400	10	1		11800	5900	0.36	C
1,1-Dichloroethylene				10			1160	580	0.05	C
1,3-Dichloropropylene				10			606	303	9.86	
Ethylbenzene				10			3200	1600	2390	
Methyl Chloride				50			55000	27500		
Methylene Chloride		300	900	20	1		19300	9650	4.4	C
1,1,2,2-Tetrachloro-										
ethane				10			932	466	0.16	C

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(*1)	(*12)	(*13)	(*14)	(*15)	(*16)	(*17)	(*18)	(*19)	(*20)	(*21)	(*22)	(*23)
Toxic	WLAa	WLAc	WLAh	LTAA	LTAC	LTAh	Limiting	WQBL	WQBL	WQBL	WQBL	Need
Parameters	Acute	Chronic	HHDM	Acute	Chronic	HHDM	A,C,RH	Avg	Max	Avg	Max	WQBL?
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	002	002	002	002	
								ug/L	ug/L	lbs/day	lbs/day	
NONCONVENTIONAL												
Total Phenols (4AAP)	5224.1	22970.5	328.15	1671.712	12174.365	328.15	328.15	328.15	780.997	0.0027368	0.0065135	no
3-Chlorophenol	---	---	6.563	---	---	6.563	6.563	6.563	15.61994	5.474E-05	0.0001303	no
4-Chlorophenol	2858.329	12600.96	6.563	914.66528	6678.5088	6.563	6.563	6.563	15.61994	5.474E-05	0.0001303	no
2,3-Dichlorophenol	---	---	2.6252	---	---	2.6252	2.6252	2.6252	6.247976	2.189E-05	5.211E-05	no
2,5-Dichlorophenol	---	---	32.815	---	---	32.815	32.815	32.815	78.0997	0.0002737	0.0006514	no
2,6-Dichlorophenol	---	---	13.126	---	---	13.126	13.126	13.126	31.23988	0.0001095	0.0002605	no
3,4-Dichlorophenol	---	---	19.689	---	---	19.689	19.689	19.689	46.85982	0.0001642	0.0003908	no
2,4-Dichlorophenoxy-												
acetic acid (2,4-D)	---	---	6563	---	---	6563	6563	6563	15619.94	0.0547354	0.1302703	no
2-(2,4,5-Trichlorophen-												
oxy) propionic acid												
(2,4,5-TP, Silvex)	---	---	656.3	---	---	656.3	656.3	656.3	1561.994	0.0054735	0.013027	no
METALS AND CYANIDE												
Total Arsenic	5853.5707	22723.63	7574.5435	1873.1426	12043.524	7574.5435	1873.1426	2453.8169	5825.4736	0.0204648	0.0485844	no
Total Cadmium	1499.9005	353.31317	2276.2458	479.96815	187.25598	2276.2458	187.25598	245.30533	582.36609	0.0020458	0.0048569	no
Chromium III	34534.084	98515.352	17580.529	11050.907	52213.137	17580.529	11050.907	14476.688	34368.321	0.1207356	0.2866318	no
Chromium VI	117.25866	694.49666	32365	37.52277	368.08323	32365	37.52277	49.154829	116.69581	0.00041	0.0009732	no
Total Copper	864.65745	4828.831	244880.16	276.69038	2559.2805	244880.16	276.69038	362.4644	860.50709	0.003023	0.0071766	no
Total Lead	6030.8365	2066.7166	22591.72	1929.8677	1095.3598	22591.72	1095.3598	1434.9213	3406.5689	0.0119672	0.0284108	no
Total Mercury	35.254501	2.1455354	357.58924	11.28144	1.1371338	357.58924	1.1371338	1.4896452	3.536486	1.242E-05	2.949E-05	no
Total Nickel	57708.38	56360.881	---	18466.682	29871.267	---	18466.682	24191.353	57431.379	0.2017559	0.4789777	no
Total Zinc	6566.581	52731.627	1577884	2101.3059	27947.762	1577884	2101.3059	2752.7108	6535.0614	0.0229576	0.0545024	no
Total Cyanide	342.5517	341.276	43565.194	109.61654	180.87628	43565.194	109.61654	143.59767	340.90745	0.0011976	0.0028432	yes
DIOXIN												
2,3,7,8 TCDD; dioxin	---	---	0.0004596	---	---	0.0004596	0.0004596	0.0004596	0.0010938	3.833E-09	9.122E-09	no
VOLATILE COMPOUNDS												
Benzene	16784.287	73833.75	712.03	5370.9718	39131.888	712.03	712.03	712.03	1694.6314	0.0059383	0.0141332	no
Bromoform	21866.59	96147.95	2524.47	6997.3088	50958.414	2524.47	2524.47	2524.47	6008.2386	0.0210541	0.0501087	no
Bromodichloromethane	---	---	129.46	---	---	129.46	129.46	129.46	308.1148	0.0010797	0.0025697	no
Carbon Tetrachloride	20373.99	89584.95	142.406	6519.6768	47480.024	142.406	142.406	142.406	338.92628	0.0011877	0.0028266	no
Chloroform	21568.07	94835.35	3430.69	6901.7824	50262.736	3430.69	3430.69	3430.69	8165.0422	0.028612	0.0680965	no
Dibromochloromethane	---	---	252.447	---	---	252.447	252.447	252.447	600.82386	0.0021054	0.0050109	no
1,2-Dichloroethane	88063.4	387217	233.028	28180.288	205225.01	233.028	233.028	233.028	554.60664	0.0019435	0.0046254	no
1,1-Dichloroethylene	8657.08	38065.4	32.365	2770.2656	20174.662	32.365	32.365	32.365	77.0287	0.0002699	0.0006424	no
1,3-Dichloropropylene	4522.578	19885.89	647.1118	1447.225	10539.522	647.1118	647.1118	647.1118	1540.1261	0.0053969	0.0128447	no
Ethylbenzene	23881.6	105008	156855.7	7642.112	55654.24	156855.7	7642.112	10011.167	23766.968	0.0834931	0.1982165	no
Methyl Chloride	410465	1804825	---	131348.8	956557.25	---	131348.8	172066.93	408494.77	1.4350382	3.4068464	no
Methylene Chloride	144035.9	633329.5	2848.12	46091.488	335664.64	2848.12	2848.12	2848.12	6778.5256	0.0237533	0.0565329	no
1,1,2,2-Tetrachloro-												
ethane	6955.516	30583.58	103.568	2225.7651	16209.297	103.568	103.568	103.568	246.49184	0.0008638	0.0020557	no

[illegible]

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(+1)	(+12)	(+13)	(+14)	(+15)	(+16)	(+17)	(+18)	(+19)	(+20)	(+21)	(+22)	(+23)
Toxic Parameters	WLAa	WLAC	WLAh	LTAA	LTAc	LTAh	Limiting	WQBL	WQBL	WQBL	WQBL	Need
	Acute	Chronic	HHDW	Acute	Chronic	HHDW	A, C, HH	Avg	Max	Avg	Max	WQBL?
	002	002	002	002								
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	lbs/day	lbs/day	
Tetrachloroethylene	9627.27	42331.35	420.745	3080.7264	22435.616	420.745	420.745	420.745	1001.3731	0.003509	0.0083515	no
Toluene	9478.01	41675.05	400343	3032.9632	22087.777	400343	3032.9632	3973.1818	9432.5156	0.0331363	0.0786672	no
1,1,1-Trichloroethane	39404.64	173263.2	13126	12609.485	91829.496	13126	12609.485	16518.425	39215.498	0.1377637	0.3270573	no
1,1,2-Trichloroethane	13433.4	59067	362.488	4298.688	31305.51	362.488	362.488	362.488	862.72144	0.0030231	0.0071951	no
Trichloroethylene	29105.7	127978.5	1812.44	9313.824	67828.605	1812.44	1812.44	1812.44	4313.6072	0.0151157	0.0359755	no
Vinyl Chloride	---	---	1229.87	---	---	1229.87	1229.87	1229.87	2927.0906	0.0102571	0.0244119	no
ACID COMPOUNDS												
2-Chlorophenol	1925.454	8466.27	6.563	616.14528	4487.1231	6.563	6.563	6.563	15.61994	5.474E-05	0.0001303	no
2,4-Dichlorophenol	1507.526	6628.63	19.689	482.40832	3513.1739	19.689	19.689	19.689	46.85982	0.0001642	0.0003908	no
BASE NEUTRAL COMPOUNDS												
Benidine	1865.75	8203.75	0.051784	597.04	4347.9875	0.051784	0.051784	0.051784	0.1232459	4.319E-07	1.028E-06	no
Hexachlorobenzene	---	---	0.161825	---	---	0.161825	0.161825	0.161825	0.3851435	1.35E-06	3.212E-06	no
Hexachlorabutadiene	38.0613	66.9426	58.257	12.179616	35.479578	58.257	12.179616	15.955297	37.878606	0.0001331	0.0003159	no
PESTICIDES												
Aldrin	22.389	---	0.025892	7.16448	---	0.025892	0.025892	0.025892	0.061623	2.159E-07	5.139E-07	no
Hexachlorocyclohexane (gamma BHC, Lindane)	39.5539	13.7823	71.203	12.657248	7.304619	71.203	7.304619	9.5690509	22.717365	7.981E-05	0.0001895	no
Chlordane	17.9112	0.282209	0.122987	5.731584	0.1495708	0.122987	0.122987	0.122987	0.2927091	1.026E-06	2.441E-06	no
4,4'-DDT	8.2093	0.06563	0.122987	2.626976	0.0347839	0.122987	0.0347839	0.0455669	0.1081779	3.8E-07	9.022E-07	no
4,4'-DDE	391.8075	689.115	0.122987	125.3784	365.23095	0.122987	0.122987	0.122987	0.2927091	1.026E-06	2.441E-06	no
4,4'-DDD	0.22389	0.39378	0.174771	0.0716448	0.2087034	0.174771	0.0716448	0.0938547	0.2228153	7.827E-07	1.858E-06	no
Dieldrin	1.7717162	3.655591	0.032365	0.5669492	1.9374632	0.032365	0.032365	0.032365	0.0770287	2.699E-07	6.424E-07	no
Endosulfan	1.64186	3.67528	30.8461	0.5253952	1.9478984	30.8461	0.5253952	0.6882677	1.6339791	5.74E-06	1.363E-05	no
Endrin	0.6448032	2.461125	17.0638	0.206337	1.3043963	17.0638	0.206337	0.2703015	0.6417081	2.254E-06	5.352E-06	no
Heptachlor	3.88076	0.249394	0.045311	1.2418432	0.1321788	0.045311	0.045311	0.045311	0.1078402	3.779E-07	8.994E-07	no
Toxaphene	5.44799	0.013126	0.155352	1.7433568	0.0069568	0.155352	0.0069568	0.0091134	0.0216356	7.601E-08	1.804E-07	no
Other Parameters:												
Fecal Col.(col/100ml)	---	---	---	---	---	---	---	---	---	---	---	no
Chlorine	141.797	721.93	---	45.37504	382.6229	---	45.37504	59.441302	141.11637	0.0004957	0.0011769	no
Ammonia	---	262520	---	---	139136.6	---	139135.6	182267.64	432711.72	1.5201121	3.6088157	no
Chlorides	---	---	---	---	---	---	---	---	---	---	---	no
Sulfates	---	---	---	---	---	---	---	---	---	---	---	no
TDS	---	---	---	---	---	---	---	---	---	---	---	no
	---	---	---	---	---	---	---	---	---	---	---	no
	---	---	---	---	---	---	---	---	---	---	---	no